
# Weekly Work Report

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# 1 Content

## 1.1 Logistic Regression: Cost Function

To train the parameters $\omega$ and $b$, we need to define a cost function. In logistic regression, we want $\hat{y}^{(i)} \approx y^{(i)}$.

**Loss(error) function**

The loss function measures the discrepancy between the prediction($\hat{y}^{(i)}$) and the desired output ($y^{(i)}$). In other words, the loss function as shown in Eq. 1 2 computes the error for a single training example.

$$L(\hat{y}^{(i)}, y^{(i)}) = \frac{1}{2}(\hat{y}^{(i)}, y^{(i)})^2 \tag{1}$$

$$L(\hat{y}^{(i)}, y^{(i)}) = -[y^{(i)} \log(\hat{y}^{(i)}) + (1 - y^{(i)}) \log(1 - \hat{y}^{(i)})] \tag{2}$$

- If $y^{(i)} = 1$: $L(\hat{y}^{(i)}, y^{(i)}) = -\log(\hat{y}^{(i)})$ where $\log(\hat{y}^{(i)})$ and $\hat{y}^{(i)}$ should be close to 1
- If $y^{(i)} = 0$: $L(\hat{y}^{(i)}, y^{(i)}) = -\log(1 - \hat{y}^{(i)})$ where $\log(1 - \hat{y}^{(i)})$ and $\hat{y}^{(i)}$ should be close to 0

**Cost function**

The cost function is the average of the loss function of the entire training set. We are going to find the parameters $\omega$ and $b$ that minimize the overall cost function as Eq. 3

$$J(\omega, b) = \frac{1}{m}\sigma[(y^{(i)}) \log(\hat{y}^{(i)}) + (1 - y^{(i)}) \log(1 - \hat{y}^{(i)})] \tag{3}$$

# 2 Progress in this week

**Step 1** Watched the courses clips.

**Step 2** Wathced again and took notes.

**Step 3** Grasped the related pictures and wrote the Latex.

**Step 4** Organized the content and push to the github.

# 3 Plan

**Objective:** Learn Neural Network and Deep Learning by myself.

2018.07.08—2018.05.14 Watch the rest of week two course clips and take the note.

2018.07.15—2018.07.21 Do so on week three course.

2018.05.22—2018.05.38 Do so on week tfour course.

# References


[1] A. Ng. Neural network and deep learning. `http://mooc.study.163.com/smartSpec/detail/1001319001.htm`.

[2] A. Ng. Neural network and deep learning. `https://www.coursera.org/learn/neural-networks-deep-learning/exam/QR8kq/introduction-to-deep-learning`.